U.S. Department of Energy
Office of River Protection
Mr. R. J. Schepens
Manager
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

CCN: 035828

Dear Mr. Schepens:

CONTRACT NO. DE-AC27-01RV14136 – FOR APPROVAL: AUTHORIZATION BASIS CHANGE NOTICE 24590-WTP-ABCN-ESH-02-028, REVISION 0, *CHANGE "IMPLEMENTING CODES AND STANDARDS" FROM ASME AG-1-1997 TO ASME AG-1-1997 WITH ASME AG-1A 2000 ADDENDA*

Reference: CCN 045028, Letter, R. F. Naventi, BNI, to R. J. Schepens, ORP, "Transmittal for Information – Authorization Basis Change Notice24590-WTP-ABCN-ESH-02-028, Rev. 0," dated November 12, 2002.

Authorization Basis Change Notice (ABCN) 24590-WTP-ABCN-ESH-02-028, Revision 0, was provided to the U.S. Department of Energy, Office of River Protection, and the Office of Safety Regulation (OSR) for information (reference letter). This ABCN is being resubmitted for approval because a signature was inadvertently omitted in Section I of the ABCN.

An electronic copy of ABCN 24590-WTP-ABCN-ESH-02-028, Revision 0, as well as the associated page changes, is provided for the OSR's information and use.

If you have any questions or comments, please contact Mr. Bill Spezialetti at (509) 371-5778.

Very truly yours,

R. F. Naventi
Project Manager

TR/slr

Attachment: Authorization Basis Change Notice 24590-WTP-ABCN-ESH-02-028, Revision 0, plus attachments

Authorization Basis Change Notice

ABCN Number 24590-WTP-ABCN-ENS-02-002 Revision 0

ABCN Title Canister Decontamination System (HDH) AB Compliance

I. ABCN Review and Approval Signatures

A. ABCN Preparation

Preparer:	Michael T. Staley		
	Print/Type Name	*Signature*	*Date*
Reviewer:	Devender Reddy		
	Print/Type Name	*Signature*	*Date*

B. Required Technical Reviewers

Review Required? *For each person checked, that signature block must be completed.*

☒	E&NS Manager	Fred Beranek		
		Print/Type Name	*Signature*	*Date*
☒	QA Manager	George Shell		
		Print/Type Name	*Signature*	*Date*
☐	Operations Manager			
		Print/Type Name	*Signature*	*Date*
☐	Commissioning/Training Manager			
		Print/Type Name	*Signature*	*Date*
☒	Manager of Engineering	Fred Marsh		
		Print/Type Name	*Signature*	*Date*
☐	Construction Manager			
		Print/Type Name	*Signature*	*Date*
☒	Area Project Manager	Phil Schuetz		
		Print/Type Name	*Signature*	*Date*
☐	Research & Technology Manager			
		Print/Type Name	*Signature*	*Date*
☐	PMT Chair			
		Print/Type Name	*Signature*	*Date*
☒	Other Affected Organization	Dwight Krahn		
		Print/Type Name	*Signature*	*Date*

C. ABCN Approval

PSC Chair	Bill Poulson		
	Print/Type Name	*Signature*	*Date*
WTP Project Director	Ron Naventi		
	Print/Type Name	*Signature*	*Date*

ABCN Number 24590-WTP-ABCN-ENS-02-002 Revision 0

ABCN Title Canister Decontamination System (HDH) AB Compliance

II. Description of the Proposed Change to the Authorization Basis

D. Affected Authorization Basis and Implementing Documents (drawings, procedures, plans, etc):

Title	Document Number	Revision
Preliminary Safety Analysis Report to Support Construction; HLW Facility Specific Information	24590-WTP-PSAR-ESH-01-002-04	0
Preliminary Safety Analysis Report to Support Partial Construction; HLW Facility Specific Information	24590-WTP-PSAR-ESH-01-001-04	0
P&ID- HLW Canister Decontamination Handling System	24590-HLW-M6-HDH-00001	0
P&ID- HLW Canister Decontamination Handling System	24590-HLW-M6-HDH-00002	0
Removal of Decon Effluent Collection Vessel (RLD-VSL-00001)	24590-HLW-DCA-PR-02-010	1
Process Flow Diagram HLW Vitrification HLW Canister Decon (System HDH)	24592-HLW-M5-V17T-00006	3
HLW Vitrification Building General Arrangement Plan at El. –21'-0"	24590-HLW-P1-P01T-00001	1
HLW Vitrification Building General Arrangement Sections A-A, B-B, & C-C	24590-HLW-P1-P01T-00008	3
HLW Vitrification Building General Arrangement Section J-J, & Section K-K	24590-HLW-P1-P01T-00011	3

E. Describe the proposed changes to the Authorization Basis documents. Include specific references to the AB documents and design documents that are to be changed:

24590-WTP-PSAR-ESH-01-002-04	2.4.11.1.4 2.3, 3rd paragraph 2.5.3.1.4 2.5.5.1 3.4.1.11.6.1 3.4.2.1.1 Table 3-10	Decontamination Effluent Collection Vessel has been deleted. References to this vessel need to be amended. The Effluent from the Waste Neutralization Vessel will go directly to Pretreatment.
24590-WTP-PSAR-ESH-01-002-04	2.4.11.7	Canister Rinse Bogie Tunnel and Bogie Decon/Maintenance has two different room numbers. Should read as (H-B039B, H-B039A)
24590-WTP-PSAR-ESH-01-002-04	Table 3-1 Column 16	Capacity for the Waste Neutralization Vessel is 4819 gallons, not 4295 gallons.

ABCN Number 24590-WTP-ABCN-ENS-02-002 Revision 0

ABCN Title Canister Decontamination System (HDH) AB Compliance

E. Describe the proposed changes to the Authorization Basis documents. Include specific references to the AB documents and design documents that are to be changed:

24590-WTP-PSAR-ESH-01-002-04	Table 3-3 3rd row,	The tank number for the nitric acid addition tank is HDH-TK-00001, not T33001. Fluid contents for this tank is 1M nitric acid, not 2M.
24590-WTP-PSAR-ESH-01-002-04	Table 3-3 4th row	The tank number for the cerium addition tank is HDH-TK-00002, not T33002. Maximum capacity for the Cerium Nitrate Addion Tank is 25 gallons not 27 gallons.
24590-WTP-PSAR-ESH-01-002-04	Table 3-3 5th row	Hydrogen peroxide addition pot is called hydrogen peroxide addition tank and is numbered HDH-TK-00003 not T33003
24590-WTP-PSAR-ESH-01-002-04	Table 3-3 6th row	Canister decontamination tank is called canister decontamination vessel and is numbered HDH-VSL-00002 not V33001. The room number for this vessel is H-0133 not H-059. Maximum capacity for the Canister Decon Vessel is the batch capacity of 212 gallons not 560 gallons.
24590-WTP-PSAR-ESH-01-002-04	Table 3-3 7th row	Waste neutralization tank is called waste neutralization vessel and is numbered HDH-VSL-00003 not V33002. The room number for this vessel is H-0133 not H-059. Maximum capacity for the Waste Neutralization Vessel is 4819 gallons not 4295 gallons.
24590-WTP-PSAR-ESH-01-002-04	Table 3-10 Non-H2 Vessels and Embedments section	The vessel number for the Canister Decontamination Vessel is HDH-VSL-00002 not V33001. The vessel number for the Canister Decon Bogie Vessel is HDH-VSL-00001 not V33004. And the vessel number for the Waste Neutralization Vessel is HDH-VSL-00003 not V33002.
24590-WTP-PSAR-ESH-01-002-04	Table 3-11Row 3	Change vessel number from V33002 to HDH-VSL-00003.
24590-WTP-PSAR-ESH-01-001-04	2.4.11.1.4	Decontamination Effluent Collection Vessel has been deleted and no longer exists in the facility.
24590-WTP-PSAR-ESH-01-001-04	2.4.11.7	Canister Rinse Bogie Tunnel and Bogie Decon/Maintenance has two different room numbers. Should read as (H-B039B, H-B039A)
24590-WTP-PSAR-ESH-01-001-04	2.4.11.17	Canister Decon Cave, Canister Rinse-Bogie Decon, and Canister Rinse Bogie Tunnel are

E. Describe the proposed changes to the Authorization Basis documents. Include specific references to the AB documents and design documents that are to be changed:

		listed with old room numbers. The room numbers should be H-133, H-B039A, and H-B039B.
24590-WTP-PSAR-ESH-01-001-04	3.3.2.1.3 Paragraph 7	Hydrogen peroxide is not stored in the Hydrogen Peroxide Addition Tanks. This reagent is stored in its respective container from the vendor. The hydrogen peroxide addition pot is called the hydrogen peroxide addition tank. Cerium is not stored in the Ceric Nitrate Addition Tank. This reagent is stored in its respective container from the vendor. The mixture from the waste neutralization vessel is transferred to Pre-Treatment Facility, not the liquid waste system.
24590-WTP-PSAR-ESH-01-001-04	3.2 Paragraph 7	The canister decontamination process liquid waste does not go to the liquid waste system as indicated. It will go directly to the Pre-Treatment Facility.
24590-WTP-PSAR-ESH-01-001-04	3.4.2.1.1	Vessel number for the Waste Neutralization Vessel is HDH-VSL-00003, not V33002. Vessel number for the Canister Decon Bogie Vessel is HDH-VSL-00001, not V33004
24590-WTP-PSAR-ESH-01-001-04	Table 3-3 3rd row,	The tank number for the nitric acid addition tank is HDH-TK-00001, not T33001. Fluid contents for this tank is 1M nitric acid, not 2M.
24590-WTP-PSAR-ESH-01-001-04	Table 3-3 4th row	The tank number for the cerium addition tank is HDH-TK-00002, not T33002. Maximum capacity for the Cerium Nitrate Addion Tank is 25 gallons not 27 gallons.
24590-WTP-PSAR-ESH-01-001-04	Table 3-3 5th row	Hydrogen peroxide addition pot is called hydrogen peroxide addition tank and is numbered HDH-TK-00003 not T33003
24590-WTP-PSAR-ESH-01-001-04	Table 3-3 6th row	Canister decontamination tank is called canister decontamination vessel and is numbered HDH-VSL-00002 not V33001. The room number for this vessel is H-0133 not H-059. Maximum capacity for the Canister Decon Vessel is the batch capacity of 212 gallons not 560 gallons.

Authorization Basis Change Notice

ABCN Number 24590-WTP-ABCN-ENS-02-002 Revision 0

ABCN Title Canister Decontamination System (HDH) AB Compliance

E. Describe the proposed changes to the Authorization Basis documents. Include specific references to the AB documents and design documents that are to be changed:

24590-WTP-PSAR-ESH-01-001-04	Table 3-3 7th row	Waste neutralization tank is called waste neutralization vessel and is numbered HDH-VSL-00003 not V33002. The room number for this vessel is H-0133 not H-059. Maximum capacity for the Waste Neutralization Vessel is 4819 gallons not 4295 gallons.
24590-WTP-PSAR-ESH-01-001-04	Table 3-11, page3-69 in Non-H2 Vessels and Embedments section	The vessel number for the Canister Decontamination Vessel is HDH-VSL-00002 not V33001. The vessel number for the Canister Decon Bogie Vessel is HDH-VSL-00001 not V33004. And the vessel number for the Waste Neutralization Vessel is HDH-VSL-00003 not V33002.
24590-WTP-PSAR-ESH-01-001-04	Appendix A Section 1	Section identifies the hazardous situation by system. The Product canister decontamination, swabbing, and monitoring system designation is HDH not H330
24590-WTP-PSAR-ESH-01-001-04	Table 1-2 of Appendix C Page C-ix, Non-H2 Vessels and Embedments section,	The vessel number for the Canister Decontamination Vessel is HDH-VSL – 00002, not V33001. The vessel number for the Canister Decon Bogie Vessel is HDH-VSL-00001, not V33004. And the Vessel number for the Waste Neutralization Vessel is HDH-VSL-00003, not V33002.

F. Explain why the change is needed:

The volumes of vessels and tanks have changed in accordance with the PFD and the design guide criteria. The Decontamination Vessel (HDH-VSL-00002) volume was listed as 560 gallons. This is the volume of the vessel without the canister inside the vessel. The batch volume is 212 gallons. The intent of the AB documents is still the same, but the actual volume of liquid that is in the vessel is 212 gallons (the canister is considered an internal displacement item, therefore not part of the vessel volume). The Ceric Nitrate Addition Tank volume was decreased from 27 gallons to 25 gallons. The Waste Neutralization Vessel (HDH-VSL-00003) has increased in volume from 4295 gallons to 4819 gallons. This increase is due to increase in the batch volume and vessel design criteria.

The PFD that is shown in the PCAR is an old revision (Rev. 0). The current revision is up to Revision #3 with a Revision #4 out on DRR.

The Effluent Collection Vessel has been deleted. This vessel was part of the RLD system. The effluent for HDH system used to go to this vessel until it was deleted. The effluent for HDH system now goes directly to Pretreatment facility. With the deletion of the Effluent Collection Vessel, the retention volume of potentially radioactive fluid will decrease overall. The dose rates will most likely need to be recalculated due to volume changes in the vessels (PSAR sec. 3.4.2.1).

Authorization Basis Change Notice

ABCN Number 24590-WTP-ABCN-ENS-02-002 Revision 0

ABCN Title Canister Decontamination System (HDH) AB Compliance

III. Summary of Safety Evaluation

G. DOE approval of this AB change is not required because the Safety Evaluation has determined that the change meets all the criteria for Contractor approval of the change.

Summarize the results of the Safety Evaluation by checking the statements below for Administrative Control changes OR Facility changes, not both. Add clarifying remarks, as necessary, to provide complete and accurate information.

Safety Evaluation No. 24590-WTP-SE-ENV-02-002 Rev 0

☐ For an Administrative Control:

This administrative control change does not affect the SRD. The change falls beneath the level of detail described in the Code of Federal Regulations applicable to the project (10 CFR 820, 10 CFR 830, and 10 CFR 835). The change conforms to the requirements in the top-level safety standards (e.g., DOE/RL-96-0006). The change provides adequate safety because the applicable questions on the Safety Evaluation have been answered in a way that ensures adequate safety following the change. The change conforms to contract requirements and will not result in inconsistencies with other AB or authorization agreement commitments or descriptions.

Remarks:

☒ For a Facility Control:

This facility change does not affect the SRD. The change does not create a new DBE or increase the frequency or consequence of an analyzed DBE. The change does not result in a decrease in the safety function of an ITS SSC or change how an SDC SSC meets its respective safety function. The change falls beneath the level of detail described in the Code of Federal Regulations applicable to the project (10 CFR 820, 10 CFR 830, and 10 CFR 835). The change conforms to the requirements in the top-level safety standards (e.g., DOE/RL-96-0006). The change provides adequate safety because the applicable questions on the Safety Evaluation have been answered in a way that ensures adequate safety following the change. The change conforms to contract requirements and will not result in inconsistencies with other AB or authorization agreement commitments or descriptions.

Remarks:

All changes are within the intent of the AB documents. All changes are consistent with top level standards and do not result in non-conformance of the contract requirments.

H. Attachments (if any):

24590-WTP-ABCN-ESH-02-028 Rev 0

Attachment 1

Proposed SRD Page Changes

Document Part	Title	No. of Pages
Section 4.4	Electrical and Mechanical Systems	8
Section 5.0	Radiation Protection	10

# of pages (including cover sheet): 19

5.0 Radiation Protection

Safety Criterion: 5.0 - 1

A Radiation Protection Program (RPP) compliant with 10 CFR 835 shall be developed and submitted for approval to DOE.

The WTP Radiological Controls Program shall address all items in 10 CFR 835 and the additional Safety Criteria provided in SRD Volume II Sections 5.1 and 5.2.

Implementing Codes and Standards

DOE G 441.1-1, *Management and Administration of Radiation Protection Programs Guide*

Regulatory Basis

10 CFR 835 Occupational Radiation Protection Location: 101(a-f)
DOE/RL-96-0006 4.2.3.1 Radiation Protection-Radiation Protection Practices
DOE/RL-96-0006 4.3.2.1 Radiation Protection-Radiation Practices
DOE/RL-96-0006 4.3.2.2 Radiation Protection-Procedures and Monitoring

5.1 Occupational Radiation Protection

Safety Criterion: 5.1 - 1

This safety criterion has been deleted.

Safety Criterion: 5.1 - 2

A respiratory protection program shall be established that includes:

(1) Use of respiratory protection equipment, including equipment used as emergency devices, that is tested and certified or had certification extended by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA).

(2) Air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate exposures.

(3) Surveys and bioassays, as appropriate, to evaluate actual intakes.

(4) Testing of respirators for operability immediately prior to each use.

(5) Written procedures regarding selection, fitting, issuance, maintenance, and testing of respirators, including testing for operability immediately prior to each use; supervision and training of personnel; monitoring, including air sampling and bioassays; and recordkeeping.

(6) Determination by a physician prior to the initial fitting of respirators, and either every 12 months thereafter or periodically at a frequency determined by a physician, that the individual user is medically fit to use the respiratory protection equipment.

(7) A written policy statement on respirator usage covering:

(i) The use of process or other engineering controls, instead of respirators.

(ii) The routine, nonroutine, and emergency use of respirators.

(iii) The periods of respirator use and relief from respirator use. Each respirator user will be informed that they may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other conditions that might require such relief.

(8) Use of equipment within limitations for type and mode of use and provision for proper visual, communication, and other special capabilities (such as adequate skin protection) when needed.

(9) Notification to the Regulator, in writing, at least 30 days before the date that respiratory protection equipment is first used to protect workers from airborne radioactivity.

Implementing Codes and Standards

ANSI Z-88.2-1992, *American National Standard for Respiratory Protection*

Safety Criterion: 5.1 - 3

This safety criterion has been deleted.

Safety Criterion: 5.1 - 4

This safety criterion has been deleted.

Safety Criterion: 5.1 - 5

This safety criterion has been deleted.

Safety Criterion: 5.1 - 6

This safety criterion has been deleted.

Safety Criterion: 5.1 - 7

This safety criterion has been deleted.

5.2 Occupational Radiation Protection Design

Safety Criterion: 5.2 - 1

This Safety Criterion has been deleted

Safety Criterion: 5.2 - 2

This Safety Criterion has been deleted

Safety Criterion: 5.2 - 3

This Safety Criterion has been deleted

Safety Criterion: 5.2 - 4

This Safety Criterion has been deleted

5.3 Environmental Radiation Protection

Safety Criterion: 5.3 - 1

An Environmental Radiological Protection Program shall be prepared and submitted to the regulator.

The Environmental Radiological Protection Program (ERPP) shall address the following elements, as appropriate:

(1) the identity of existing and anticipated types of activities and areas of the site subject to the ERPP

(2) the measures to be used to implement the ERPP

(3) the methods to be used to monitor, report, and record compliance with the ERPP

(4) models and methods used for dose assessment including bioaccumulation and dose-conversion factors

(5) an As Low As is Reasonably Achievable (ALARA) Program

(6) effluent and environmental monitoring including:

- (i) sources of airborne emissions
- (ii) sources of discharges in liquid waste streams
- (iii) effluent monitoring
- (iv) environmental surveillance
- (v) meteorological data acquisition
- (vi) pre-operational evaluation

(7) ground water protection

(8) radiological protection in the management of radioactive waste

(9) controls on the release of materials

(10) property containing residual radioactive materials

Implementing Codes and Standards

ANSI/ISO-14001-1996, *Environmental Management Systems - Specifications with guidance for use*

Regulatory Basis

DE-AC06-96RL13308 Part I Section C.5 Table S4-1
DOE/RL-96-0006 4.3.2.1 Radiation Protection-Radiation Practices
DOE/RL-96-0006 4.3.2.2 Radiation Protection-Procedures and Monitoring

Safety Criterion: 5.3 - 2

The ALARA Program shall ensure that releases of radioactive materials to the environment and exposures to the public during normal operations shall be kept ALARA and within prescribed limits.

Implementing Codes and Standards

DOE G 441.1-2, *Occupational ALARA Program Guide*

Regulatory Basis

DOE/RL-96-0006 3.2 Radiation Protection Objective
DOE/RL-96-0006 4.2.3.2 Radiation Protection-Radiation Protection Features
WAC 173-480 Ambient Air Quality Standards and Emission Limits for Radionuclides Location: Part 050 (1)

Safety Criterion: 5.3 - 3

A waste management program shall ensure compliance with all applicable laws and regulations. The waste management program shall also ensure that the radiological impact to the general public and environment due to radioactive wastes arising from WTP operation shall be ALARA.

Implementing Codes and Standards

IAEA Safety Series No. 50-SG-011, *Operational Management for Radioactive Effluents and Wastes Arising in Nuclear Power Plants*
ANSI/ISO-14001-1996, *Environmental Management Systems - Specifications with guidance for use*

Regulatory Basis

DOE/RL-96-0006 3.2 Radiation Protection Objective
DOE/RL-96-0006 4.2.3.2 Radiation Protection-Radiation Protection Features

Safety Criterion: 5.3 - 4

Equipment shall be designed and installed to monitor and maintain control over radioactive materials in gaseous and liquid effluents produced during normal operations, including anticipated operational occurrences.

Implementing Codes and Standards

40 CFR 52, Appendix E, "Performance Specifications and Specification Test Procedures for Monitoring Systems for Effluent Stream Gas Volumetric Flow Rate"
40 CFR 60, Appendix A, Methods 1, 1a, 2, 2a, 2c, 2d, 4, 5,and 17
ANSI N13.1-1969 (R 1993), *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*
ANSI N42.18-1980 (R 1991), *Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents*
ANSI N323, *Radiation Protection Instrumentation Test and Calibration*
~~ASME/ANSI AG-1, *Code on Nuclear Air and Gas Treatment*~~
ASME AG-1-1997 with ASME AG-1a-2000 Addenda, Code on Nuclear Air and Gas Treatment
ASME/ANSI N509, *Nuclear Power Plant Air-Cleaning Units and Components*
ASME/ANSI N510, *Testing of Nuclear Air Cleaning Systems*

Regulatory Basis

DOE/RL-96-0006 3.2 Radiation Protection Objective
DOE/RL-96-0006 4.2.3.2 Radiation Protection-Radiation Protection Features
WAC 246-247 Radiation Protection - Air Emissions Location: Part 075
WAC 246-247 Radiation Protection - Air Emissions Location: Part 110
WAC 246-247 Radiation Protection - Air Emissions Location: Part 120

Safety Criterion: 5.3 - 5

All new construction and significant modifications of air emission units shall utilize best available radionuclide control technology (BARCT).

Implementing Codes and Standards

WAC 246-247-120, Appendix B, "BARCT Compliance Demonstration"
~~ASME/ANSI AG-1, *Code on Nuclear Air and Gas Treatment*~~
ASME AG-1-1997 with ASME AG-1a-2000 Addenda, Code on Nuclear Air and Gas Treatment
ASME/ANSI N509, *Nuclear Power Plant Air-Cleaning Units and Components*
ASME/ANSI N510, *Testing of Nuclear Air Cleaning Systems*
ANSI N13.1, *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*
ANSI N42.18, *Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents*
40 CFR 60, Appendix A, Methods 1, 1a, 2, 2a, 2c, 2d, 4, 5,and 17

Regulatory Basis

WAC 173-480 Ambient Air Quality Standards and Emission Limits for Radionuclides Location: Part 060
WAC 246-247 Radiation Protection - Air Emissions Location: Part 040 (3)

Safety Criterion: 5.3 - 6

Activities shall be conducted in such a manner that no radioactive material is discharged into sanitary sewers. Exempt from this Safety Criterion are trace radioactive materials present in:

(1) readily soluble waste such as kitchen waste from breakrooms, custodial cleaning solutions, or other materials of similar non-WTP process origin

(2) biological waste (solid and liquid human waste) which is readily dispersed in water

Also exempt from this Safety Criterion are excreta from individuals undergoing medical diagnosis or therapy with radioactive materials.

Implementing Codes and Standards

IAEA Safety Series No. 50-SG-011, *Operational Management for Radioactive Effluents and Wastes Arising in Nuclear Power Plants*

Regulatory Basis

DOE/RL-96-0006 3.2 Radiation Protection Objective
DOE/RL-96-0006 4.2.3.2 Radiation Protection-Radiation Protection Features

Safety Criterion: 5.3 - 7

Liquid discharges from the facility, other than sanitary sewer discharges, shall comply with ALARA process requirements, be treated by the best available technology, and not result in release of settleable solids to surface waters for streams exceeding 5 pCi/g for alpha-emitting radionuclides, and/or 50 pCi/g for beta-emitting radionuclides.

Note: The WTP design does not include provisions for liquid waste discharges, other than sanitary sewer discharges. Therefore, Implementing Codes and Standards are not required. If the WTP design changes such that liquid discharges result, an SRD revision will be prepared.

Safety Criterion: 5.3 - 8

Controls on the release of materials and property containing residual radioactive material shall be established.

Implementing Codes and Standards

10 CFR 835, "Occupational Radiation Protection", Appendix D (ad hoc)

Note: The Appendix D values will be used as surface contamination criteria for determining the suitability of releasing material from radiologically controlled areas. These criteria are not applicable to materials potentially contaminated throughout their volume. Because the WTP process feed is a mixed waste, any items that are determined to be contaminated, will also be assumed to be a mixed waste (i.e., containing a State of Washington dangerous waste). Rather than determine the quantities of dangerous wastes present, these materials will be disposed of as mixed wastes.

Regulatory Basis

DOE/RL-96-0006	*3.2*	*Radiation Protection Objective*
DOE/RL-96-0006	*4.2.3.1*	*Radiation Protection-Radiation Protection Practices*

5.4 Environmental Radiological Monitoring

Safety Criterion: 5.4 - 1

Each source shall have capability for independent effluent emission testing as follows:

(1) Sampling ports adequate for test methods applicable to each source

(2) Safe sampling platform(s)

(3) Safe access to sampling platform(s)

(4) Utilities for sampling and testing equipment

(5) Any other facilities deemed necessary to safely and properly test a source

Implementing Codes and Standards

ANSI N13.1-1969 (R 1993), *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*

Regulatory Basis

40 CFR 61	*National Emission Standards for Hazardous Air Pollutants*	*Location: 13*
WAC 246-247	*Radiation Protection - Air Emissions*	*Location: Part 075 (10)*
WAC 246-247	*Radiation Protection - Air Emissions*	*Location: Part 075 (9)*

Safety Criterion: 5.4 - 2

Nonpoint and fugitive emissions of radioactive material shall be monitored.

Implementing Codes and Standards

ANSI N13.1-1969 (R 1993), *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*

Regulatory Basis

WAC 246-247	*Radiation Protection - Air Emissions*	*Location: Part 075 (8)*

Safety Criterion: 5.4 - 3

Direct measurements shall be made, to the extent practicable, to obtain information characterizing source terms, exposures, exposure modes, and other information needed in evaluating doses.

Implementing Codes and Standards

ANSI N13.1-1969 (R 1993), *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*

Regulatory Basis

WAC 246-221 Radiation Protection Standards Location: 070 (1)

Safety Criterion: 5.4 - 4

When the effluents from a single source, or from two or more sources subject to the same emission standards, are combined before being released to the atmosphere, a monitoring system shall be installed on each effluent or on the combined effluent. If two or more sources are not subject to the same emission standards, a separate monitoring system shall be installed on each effluent. If the applicable standard is a mass emission standard and the effluent from one source is released to the atmosphere through more than one point, a monitoring system shall be installed at each emission point.

Implementing Codes and Standards

ANSI N13.1-1969 (R 1993), *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*

Regulatory Basis

40 CFR 61 National Emission Standards for Hazardous Air Pollutants Location: 14 (d)

Safety Criterion: 5.4 - 5

Equipment and procedures used for the continuous monitoring of radioactive air emissions shall conform, to applicable guidance.

Implementing Codes and Standards

40 CFR 52, Appendix E, "Performance Specifications and Specification Test Procedures for Monitoring Systems for Effluent Stream Gas Volumetric Flow Rate"
40 CFR 60, Appendix A, Test Methods 1, 1a, 2, 2a, 2c, 2d, 4, 5,and 17
40 CFR 61, Appendix B, Test Method 114
ANSI N13.1-1969 (R 1993), *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*
ANSI N323, *Radiation Protection Instrumentation Test and Calibration*
ANSI N42.18-1980 (R 1991), *Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents*

Regulatory Basis

40 CFR 61 National Emission Standards for Hazardous Air Pollutants Location: 93
WAC 246-247 Radiation Protection - Air Emissions Location: Part 075 (2)

Safety Criterion: 5.4 - 6

Computer codes or procedures used to determine the offsite total effective dose equivalent from airborne emissions shall be EPA approved.

Implementing Codes and Standards
ANSI/ISO-14001-1996, *Environmental Management Systems - Specification with Guidance for Use*

Regulatory Basis
40 CFR 61 National Emission Standards for Hazardous Air Pollutants Location: 93
WAC 246-247 Radiation Protection - Air Emissions Location: Part 085 (2)

Safety Criterion: 5.4 - 7

Compliance with the annual dose limit for individual members of the public (100 mrem/yr from all sources) shall be shown by:

(1) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the operation does not exceed the annual dose limit; or

(2) Demonstrating that:

(a) The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in Table II of WAC246-221-290.

(b) If an individual were continuously present in an unrestricted area, the dose from external sources would not exceed 0.002 rem in an hour and 0.05 rem in a year.

Implementing Codes and Standards
ANSI/ISO-14001-1996, *Environmental Management Systems - Specification with Guidance for Use*

Regulatory Basis
40 CFR 61 National Emission Standards for Hazardous Air Pollutants Location: 93
WAC 246-221 Radiation Protection Standards Location: 070 (2)
WAC 246-247 Radiation Protection - Air Emissions Location: Part 085 (1)

Safety Criterion: 5.4 - 8

Compliance with the public air emission standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any offsite point where there is a residence, school, business or office.

The determination of compliance shall include all radioactive air emissions resulting from routine and nonroutine operations for the past calendar year.

Implementing Codes and Standards
ANSI/ISO-14001-1996, *Environmental Management Systems - Specification with Guidance for Use*

Regulatory Basis
40 CFR 61 National Emission Standards for Hazardous Air Pollutants Location: 94
WAC 246-247 Radiation Protection - Air Emissions Location: Part 085 (3)

Safety Criterion: 5.4 - 9

Records sufficient to demonstrate compliance with the dose limit for individual members of the public shall be maintained. Records must document the source of input parameters including the results of all measurements upon which they are based, the calculations and/or analytical methods used to derive values for input parameters, and the procedure used to determine compliance. This documentation should be sufficient to allow an independent auditor to verify the accuracy of the determination made concerning the facility's compliance.

Implementing Codes and Standards

ANSI/ISO-14001-1996, *Environmental Management Systems - Specification with Guidance for Use*

Regulatory Basis

40 CFR 61 National Emission Standards for Hazardous Air Pollutants Location: 95
WAC 246-247 Radiation Protection - Air Emissions Location: Part 080

Safety Criterion: 5.4 - 10

An environmental surveillance program shall be developed and implemented to include:

(1) Meteorological data acquisition (Note 1)

(2) Pre-operational evaluation (Note 2)

(3) Near-Facility Monitoring (Note 3)

(4) Ground Water Protection (Note 4)

Implementing Codes and Standards

ANSI/ISO-14001-1996, *Environmental Management Systems - Specification with guidance for use*
IAEA Safety Series No 41, *Objectives and Design of Environmental Monitoring Programmes for Radioactive Contaminants*

Notes:

1. BNFL-5193-ID-03, *Interface Control Document*, Revision 2, *ICD-22 between DOE and BNFL Inc. for Air Emissions,* Table 2 states that DOE will maintain the Hanford Site Air Operating Permit (AOP) and provide access to meteorological data.
2. BNFL-5193-ID-03, *Interface Control Document*, Revision 2, *ICD-09 Between DOE and BNFL Inc. for Land Siting,* Table 1, describes specific interfaces responsibilities for the WTP contractor and for the DOE. Item 12 of the table requires that the WTP contractor perform any additional site characterization work beyond that which was performed by the DOE. The RPP describes the plans and measures for compliance with the survey and contamination control requirements of 10 CFR 835.
3. As described in BNFL-5193-ID-03, *Interface Control Document*, Revision 2, *ICD-22 between DOE and BNFL Inc. for Air Emissions,* DOE will continue to operate site and near-facility monitoring networks in the vicinity of the WTP site. Additional monitoring which is required will be provided by the WTP contractor. If additional monitoring is required, it will be performed consistent with the Hanford Site near-facility monitoring program for inclusion in site annual reports (example, HNF-EP-0573-6, *Hanford site Near-Facility Environmental Monitoring Annual Report, Calendar Year 1997*).

4. BNFL-5193-ID-03, *Interface Control Document*, Revision 2, *ICD-09 between DOE and BNFL Inc. for Land Siting,* Section 3.3, Ground Water Monitoring Wells, states that that the DOE will "…close groundwater monitoring well E25-32 prior to the start of site work…" There is no liquid discharge to the environment from WTP operations. Transfer piping to the Effluent Treatment Facility is by means of a three-inch pipe encased in a 6-inch pipe. Potential leakage from the transfer pipe is contained, and collected by the outer pipe. Accidental release of the inner pipe contents would be detected by the transfer pipe leak detection equipment. If both inner and outer pipes failed, such leakage could result in soil contamination which would be remediated prior to any contamination reaching the ground water.

Regulatory Basis

DOE/RL-96-0006	*3.2*	*Radiation Protection Objective*
DOE/RL-96-0006	*4.2.3.1*	*Radiation Protection-Radiation Protection Practices*

4.4 Electrical and Mechanical Systems

Safety Criterion: 4.4 - 1

A list of electric and mechanical components designated as Important to Safety shall be prepared and maintained. The list shall include:

(1) The performance specifications for normal operation and under conditions existing during and following accidents.

(2) The load, pressure, voltage, frequency, and other characteristics, as appropriate, for which the performance specified can be ensured.

Implementing Codes and Standards

24590-WTP-SRD-ESH-01-001-02, *Safety Requirements Document Volume II*
Appendix A, "Implementing Standard for Safety Standards and Requirements Identification"

Safety Criterion: 4.4 - 2

Structures, systems, and components Important to Safety shall be designed and qualified to function as intended in the environments associated with the events for which they are intended to respond. The effects of aging on normal and abnormal functioning shall be considered in design and qualification.

Implementing Codes and Standards

10 CFR 50.49, "Environmental qualification of electric equipment important to safety for nuclear power"
IEEE 323-83, *Qualifying Class 1E Equipment for Nuclear Power Generating Stations*

Regulatory Basis

DOE/RL-96-0006 *4.2.2.3 Proven Engineering Practices/Margins-Safety System Design and Qualification*

Safety Criterion: 4.4 - 3

This Criterion has been deleted.

Safety Criterion: 4.4 - 4

Structures, systems, and components Important to Safety shall be designated, designed and constructed to permit appropriate inspection, testing, and maintenance throughout their operating lives to verify their continued acceptability for service with an adequate safety margin.

Systems and components designated as Important to Safety that are located in closed cells where access is not possible during facility operation or scheduled shutdown periods shall be designed and constructed to standards aimed at ensuring their suitability for the entire service life with an adequate safety margin. Alternately, provisions may be made for remote replacement, standby cells, or equipment or other methods capable of ensuring a serviceable facility with adequate safety for the duration of the intended operating life.

Implementing Codes and Standards

24590-WTP-SRD-ESH-01-001-02, *Safety Requirements Document Volume II*
Appendix A, "Implementing Standard for Safety Standards and Requirements Identification"
Appendix E, "Reliability, Availability, Maintainability, and Inspectability (RAMI)"
IEEE 338-1987, *Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems*

ISA S84.01-1996, *Application of Safety Instrumented Systems for the Process Industries*

Regulatory Basis

DOE/RL-96-0006 4.2.7.1 Reliability, Availability, Maintainability, and Inspectability (RAMI)-Reliability
DOE/RL-96-0006 4.2.7.2 Reliability, Availability, Maintainability, and Inspectability (RAMI)-Availability, Maintainability, and Inspectability

Safety Criterion: 4.4 - 5

Each air treatment system designated as Safety Design Class shall have suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and confinement capabilities to ensure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) its safety function can be accomplished, assuming a single failure.

The use of alternate equipment may be considered to satisfy the single failure requirement.

Implementing Codes and Standards

IEEE 379-1994, *Application of the Single Failure Criterion to Nuclear Power Generating Station Safety Systems*
ISA S84.01-1996, *Application of Safety Instrumented Systems for the Process Industries*

Safety Criterion: 4.4 - 6

Each air treatment system designated as Safety Design Class shall be designed to ensure its operability under normal and accident conditions. The design shall permit appropriate periodic inspection and pressure and functional testing to assure:

(1) the structural and leaktight integrity of its components

(2) the operability and performance of the active components of the systems such as fans, filters, dampers, pumps, and valves

(3) the operability of the systems as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the systems into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of associated systems

Implementing Codes and Standards

ASME N509-89, *Nuclear Power Plant Air Cleaning Units and Components*
~~ASME AG-1-1997, *Code on Nuclear Air and Gas Treatment*~~
ASME AG-1-1997 with ASME AG-1a-2000 Addenda, *Code on Nuclear Air and Gas Treatment*
ASME N510-1989, *Testing of Nuclear Air Treatment Systems*
IEEE 338-1987, *Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems*

Safety Criterion: 4.4 - 7

Each air treatment system designated as Safety Design Significant shall be designed to ensure its operability under normal conditions. The design shall permit appropriate periodic inspection and pressure and functional testing to assure:

(1) the structural and leaktight integrity of its components

(2) the operability and performance of the active components of the systems such as fans, filters, dampers, pumps, and valves

(3) the operability of the systems as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the systems into operation, including operation of applicable portions of the protection system

Implementing Codes and Standards

~~ASME AG-1-1997, *Code on Nuclear Air and Gas Treatment*~~
ASME AG-1-1997 with ASME AG-1a-2000 Addenda, *Code on Nuclear Air and Gas Treatment*
ASME N509-89, *Nuclear Power Plant Air Cleaning Units and Components*
ASME N510-1989, *Testing of Nuclear Air Treatment Systems*

Safety Criterion: 4.4 - 8

Ventilation systems and off-gas systems must be provided where necessary to control radiological and chemical material releases and the generation of flammable and explosive gases during normal and off-normal conditions.

Implementing Codes and Standards

~~ASME AG-1-1997, *Code on Nuclear Air and Gas Treatment*~~
ASME AG-1-1997 with ASME AG-1a-2000 Addenda, *Code on Nuclear Air and Gas Treatment*
ASME N509-89, *Nuclear Power Plant Air Cleaning Units and Components*
ASME N510-1989 (Rev 1995), *Testing of Nuclear Air Cleaning Systems*
NFPA 801-95, *Standard for Facilities Handling Radioactive Materials*

Regulatory Basis

10 CFR 835 Occupational Radiation Protection Location: 1002

Safety Criterion: 4.4 - 9

An onsite electric power system and an offsite electric power system shall be provided to permit functioning of systems designated as Safety Design Class. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure Safety Design Class functions are maintained in the event of postulated accidents. The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their specified safety functions assuming a single failure.

Implementing Codes and Standards

IEEE 308-91, *Criteria for Class 1E Power Systems for Nuclear Power Generating Stations*
IEEE 384-1992, *Standard Criteria for Independence of Class 1E Equipment and Circuits*
IEEE 450-1995, *Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations*

IEEE 484-1996, *Recommended Practice for Installation Design and Installation of Large Lead Storage Batteries for Generating Stations and Substations*
IEEE 485-1983, *Recommended Practice for Sizing Large Lead Storage Batteries for Generating Stations and Substations*
IEEE 628-1987, *Standard Criteria for the Design, Installation, and Qualification of Raceway Systems for Class 1E Circuits for Nuclear Power Generating Stations*
IEEE 741-1990, *Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations*
IEEE 946-1992, *Design of Safety-Related DC Auxiliary Power Systems for Nuclear Power Generating Stations*

Safety Criterion: 4.4 - 10

Physical and electrical separation shall be provided between diverse or redundant Safety Design Class electrical systems. Associated circuits should be avoided.

Implementing Codes and Standards

IEEE 384-1992, *Standard Criteria for Independence of Class 1E Equipment and Circuits*
IEEE 628-1987, *Standard Criteria for the Design, Installation, and Qualification of Raceway Systems for Class 1E Circuits for Nuclear Power Generating Stations*

Safety Criterion: 4.4 - 11

Electric power systems designated as Safety Design Class shall be designed to ensure their operability under normal and accident conditions. The design shall permit appropriate periodic inspection and testing of important areas and features, such as wiring, insulation, connections, and switchboards, to assess the continuity of the systems and the condition of their components. The systems shall be designed with a capability to periodically test:

(1) the operability and functional performance of the components of the systems, such as onsite power sources, relays, switches, and buses

(2) the operability of the systems as a whole and, under conditions as close to design as practical, the full operation sequence that brings the systems into operation, including operation of applicable portions of the protection system, and the transfer of the offsite power system and the onsite power system

Implementing Codes and Standards

IEEE 338-1987, *Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems*
IEEE 344-1987, *Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations*
IEEE 384-1992, *Standard Criteria for Independence of Class 1E Equipment and Circuits*
IEEE 387-1995, *Standard Criteria for Diesel-Generator Units Applied as Standby Power Generating Stations*

Safety Criterion: 4.4 - 12

Electric power systems designated as Safety Design Significant shall be designed to ensure their operability under normal conditions. The design shall permit appropriate periodic inspection and testing of important areas and features, such as wiring, insulation, connections, and switchboards, to assess the continuity of the systems and the condition of their components. The systems shall be designed with a capability to periodically test:

(1) the operability and functional performance of the components of the systems, such as onsite power sources, relays, switches, and buses

(2) the operability of the systems as a whole and, under conditions as close to design as practical, the full operation sequence that brings the systems into operation, including operation of applicable portions of the protection system

Implementing Codes and Standards

IEEE 338-1987, *Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems*
IEEE 384-1992, *Standard Criteria for Independence of Class 1E Equipment and Circuits*
NFPA 70-1999, *National Electric Code*

Safety Criterion: 4.4 - 13

Instrument air systems designated as Safety Design Class shall have suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to ensure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming on-site power is not available) the system safety function can be accomplished, assuming a single failure.

Implementing Codes and Standards

ANS 59.3-1992, *Nuclear Safety Criteria for Control Air Systems*
IEEE 379-1994, *Application of the Single Failure Criterion to Nuclear Power Generating Station Safety Systems*
ISA S84.01-1996, *Application of Safety Instrumented Systems for the Process Industries*

Safety Criterion: 4.4 - 14

Instrument air systems designated as Safety Design Class that provide air to a non-Safety Design Class air system shall be provided with adequate isolation such that failure of the non-Safety Design Class portion of the system will not prevent the Safety Design Class portion from performing its specified safety function.

Implementing Codes and Standards

ANS 59.3-1992, *Nuclear Safety Criteria for Control Air Systems*

Safety Criterion: 4.4 - 15

Instrument air systems designated as Safety Design Class shall be designed to ensure their operability under normal and accident conditions. The design shall permit appropriate periodic pressure and functional testing to assure:

(1) air quality

(2) the structural integrity of its components

(3) the operability and the performance of the active components of the system

(4) the operability of the system as a whole and, under conditions as close to design as practical, including operation of applicable portions of the protection system and the transfer between normal and emergency power sources

Implementing Codes and Standards

ANS 59.3-1992, *Nuclear Safety Criteria for Control Air Systems*
ASME B31.3-96, *Process Piping*
ASME PTC 9-70, *Performance Test Codes, Displacement Compressors, Vacuum Pumps and Blowers*
ASME SEC VIII, *Boiler and Pressure Vessel Codes, Rules for Construction of Pressure Vessels*
IEEE 338-1987, *Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems*

Safety Criterion: 4.4 - 16

Instrument air systems designated as Safety Design Significant shall be designed to ensure their operability under normal conditions. The design shall permit appropriate periodic pressure and functional testing to assure:

(1) air quality

(2) the structural integrity of its components

(3) the operability and the performance of the active components of the system

(4) the operability of the system as a whole and, under conditions as close to design as practical, including operation of applicable portions of the protection system

Implementing Codes and Standards

ASME B31.3-96, *Process Piping*
ASME PTC 9-70, *Performance Test Codes, Displacement Compressors, Vacuum Pumps and Blowers*
ASME SEC VIII, *Boiler and Pressure Vessel Codes, Rules for Construction of Pressure Vessels*
ISA S7.0.01-1996, *Quality Standard for Instrument Air*

Safety Criterion: 4.4 - 17

Instrument air systems supplying air to Important to Safety equipment shall provide clean, dry, and oil free air to this equipment. The instrument air shall be free of all corrosive and hazardous gases which may be drawn into the system.

Implementing Codes and Standards

ISA S7.0.01-1996, *Quality Standard for Instrument Air*

Safety Criterion: 4.4 - 18

Cooling water systems designated as Safety Design Class shall have suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to ensure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming on-site power is not available) the system safety function can be accomplished, assuming a single failure.

Implementing Codes and Standards

IEEE 379-1994, *Application of the Single Failure Criterion to Nuclear Power Generating Station Safety Systems*
ISA S84.01-1996, *Application of Safety Instrumented Systems for the Process Industries*

Safety Criterion: 4.4 - 19

Cooling water systems designated as Safety Design Class shall be designed to ensure their operability under normal and accident conditions. The design shall permit appropriate periodic inspection and pressure and functional testing to assure:

(1) Long term corrosion and/or organic fouling that could degrade system performance is detected. This shall include consideration of the impacts of organic fouling on heat exchanger performance.

(2) The potential for radioactive leakage into and out of the system and to the environment is minimized.

(3) The structural and leaktight integrity of its components.

(4) The operability and the performance of the active components of the system.

(5) The operability of the system as a whole and, under conditions as close to design as practical, including operation of applicable portions of the protection system and the transfer between normal and emergency power sources.

Implementing Codes and Standards

ASME B31.3-96, *Process Piping*
ASME SEC VIII, *Boiler and Pressure Vessel Codes, Rules for Construction of Pressure Vessels*
IEEE 338-1987, *Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems*

Safety Criterion: 4.4 - 20

Cooling water systems designated as Safety Design Significant shall be designed to ensure their operability under normal conditions. The design shall permit appropriate periodic inspection and pressure and functional testing to assure:

(1) Long term corrosion and/or organic fouling that could degrade system performance is detected. This shall include consideration of the impacts of organic fouling on heat exchanger performance.

(2) The potential for radioactive leakage into and out of the system and to the environment is minimized.

(3) The structural and leaktight integrity of its components.

(4) The operability and the performance of the active components of the system.

(5) The operability of the system as a whole and, under conditions as close to design as practical, including operation of applicable portions of the protection system.

Implementing Codes and Standards

ASME B31.3-96, *Process Piping*
ASME SEC VIII, *Boiler and Pressure Vessel Codes, Rules for Construction of Pressure Vessels*
NFPA 214-96, *Standard on Water-Cooling Towers*
TEMA B, C, or R TEMA Class "B", "C", or "R" Heat Exchangers Mechanical Standards

Safety Criterion: 4.4 - 21

Safety Design Class motor operated valves shall be specified to ensure operability against the maximum differential pressure that might occur while performing their specified accident prevention or mitigation safety function at the minimum specified terminal voltage. Consideration for mis-positioned valves is not a requirement in determining the maximum differential pressure.

Periodic testing of Safety Design Class motor operated valves shall be performed to confirm their ability to perform their specified accident prevention or mitigation safety function.

Implementing Codes and Standards

IEEE 338-1987, *Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems*